What is Claimed is:

[c1] A programmable element adapted for use in a semiconductor, said element having a resistance, said element comprising a semiconductor material doped with a dopant that decreases said resistance when said element is activated, said activation occurring when said dopant is exposed to actinic radiation.

[c2] The invention of claim 1 wherein said dopant undergoes a rearrangement in bonding configuration during said exposure to actinic radiation.

[c3] The invention of claim 1 wherein said dopant comprises a donor or an acceptor atom.

[c4] The invention of claim 3 wherein said dopant comprises arsenic and said semiconductor material comprises silicon.

[c5] The invention of claim 1 further comprising:
a cap layer located above a center portion of said programmable element; and
a contact layer located above a first end portion and a second end portion of said programmable element.

[c6] The invention of claim 5 wherein said cap layer comprises a silicon nitride layer.

[c7] The invention of claim 5 wherein said contact layer comprises a cobalt silicide layer.

[c8] A method for programming a programmable element in a semiconductor, said element comprising a dopant within a semiconductor material, said method comprising the step of electrically activating said dopant.

[c9] The method of claim 8 wherein said step of electrically activating said dopant comprises steps of:
heating said programmable element to a programming temperature; and
rapidly cooling said element from said programming temperature to an operating temperature.

[c10] The method of claim 9 wherein said step of rapidly cooling said element is performed in less than a second.

[c11] The method of claim 9 wherein said step of heating said programmable element to a

programming temperature is performed by exposing said programmable element to actinic radiation.

[c12] The method of claim 11 wherein said step of exposing said programmable element to actinic radiation comprises the step of performing a laser anneal of said element.

[c13] The method of claim 12 wherein said step of performing a laser anneal is accomplished with a laser having a wavelength of light that will not be absorbed by a cap layer of said programmable element but that will be absorbed by said semiconductor material.

[c14] The method of claim 13 wherein said cap layer comprises one of silicon dioxide and silicon nitride, said semiconductor material comprises silicon, and said laser comprises a 308 nm excimer laser.

[c15] The method of claim 8 wherein said step of electrically activating said dopant comprises the step of altering the bonding configuration of said programmable element.

[c16] The method of claim 15 wherein said step of altering the bonding configuration of said programmable element comprises the step of performing a laser anneal of said element.

[c17] A method of selecting a specific precise resistance in a programmable element comprising the steps of:
doping a semiconductor material with a dopant that decreases said resistance when said element is exposed to actinic radiation, said radiation causing substantially no mechanical deformation of said element;
exposing said programmable element to said actinic radiation for a first length of time;
determining a test resistance value of said programmable element;
comparing said test resistance value to said specific precise resistance; and
if said test resistance value does not equal said specific precise resistance, exposing said programmable element to said actinic radiation for said first length of time and repeating said steps of determining and comparing said resistance values.